PROECCO Program

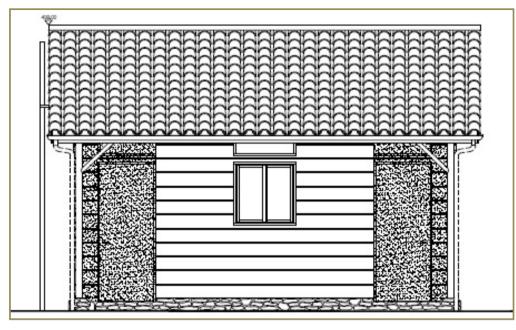
Implementing a building with torchis: Logbook

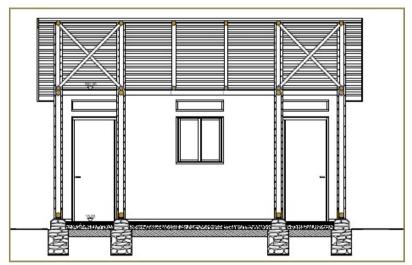




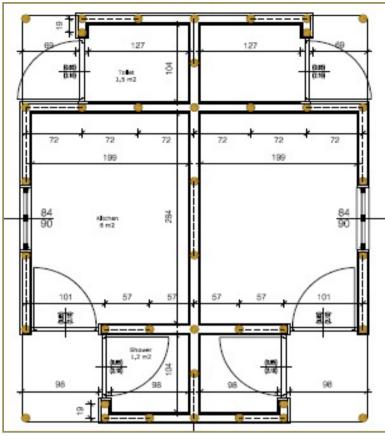


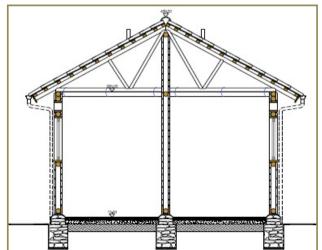
Ongoing Process : **Technical Drawings**





The aim of this pilot building built with round wood, mud and wood boards, is to show some structural solutions to improve traditional building for low income family units.

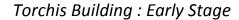


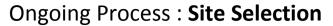














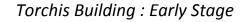
The site was chosen in close cooperation with the authorities involved in the program.











Ongoing Process : **Terracing**



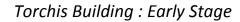
The steeply sloping of the site has imposed an important work of preliminary terracing. Due to this constraint, just a narrow stripe of land was available for the building implantation.



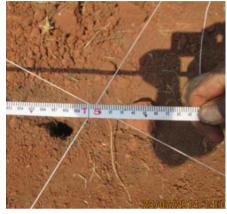








Ongoing Process : Setting up





The position of the building is the result of compromise between the needs of future dwellers and the several constraints of the site.





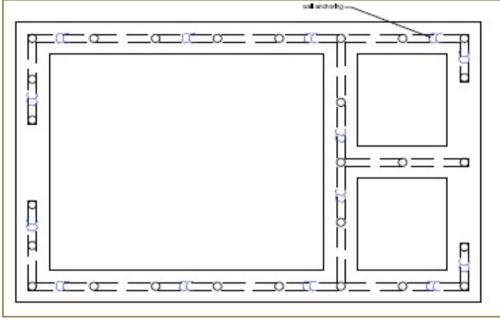






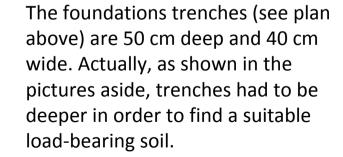


Ongoing Process : **Digging Trenches**









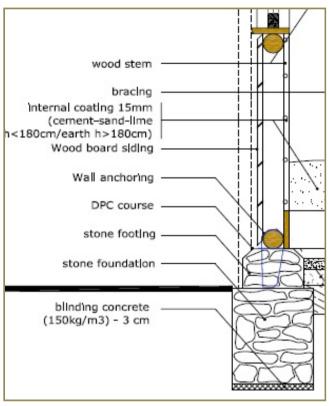








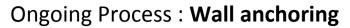
Ongoing Process : **Stone Foundation and footings**



After laying 3 cm of lean concrete on the bottom of the trench (150kg/m³), stones are put in place with cement mortar.









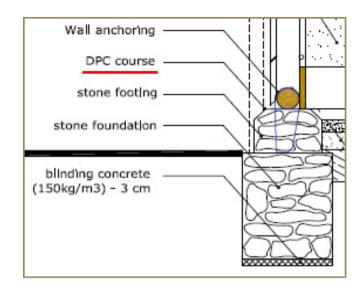


The lower horizontal pole of the wood structure is tied to the footings throughout Ø6mm iron bars passing inside the foundation.



Ongoing Process : **DPC** (Damp Proof Course)





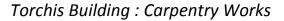


To avoid water to rise into the wall by capillarity, a water proof barrier has been laid just before the lower pole of the wood structure. Materials standing under the DPC must be water resistant.









Ongoing Process: Wood Structure

Bracing is the real innovative element for the traditional building knowledge. Thanks to these components, structure last longer and needs less than a half of wood to be built.







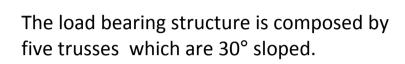






Torchis Building: Roofing

Ongoing Process : **Trusses**





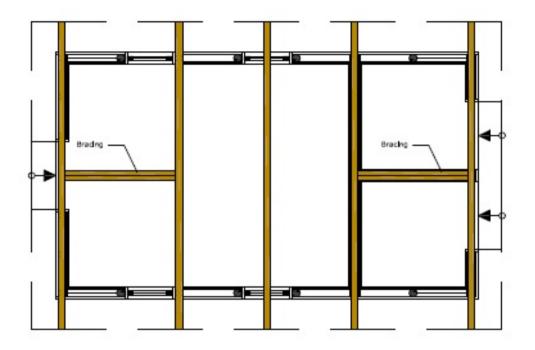








Ongoing Process: Load Bearing Structure



The roof plan above and some views of the building site.

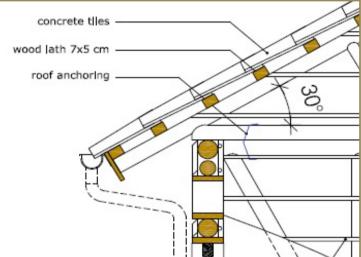








Ongoing Process : **Purlins**



Some images and details about roof implementation.





Ongoing Process: External Finishing



As traditionally done, the external finishing is made by wood boards treated with used oil.





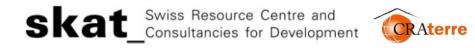
Cost of material and labour in Nyarushishi in 2014 2015.





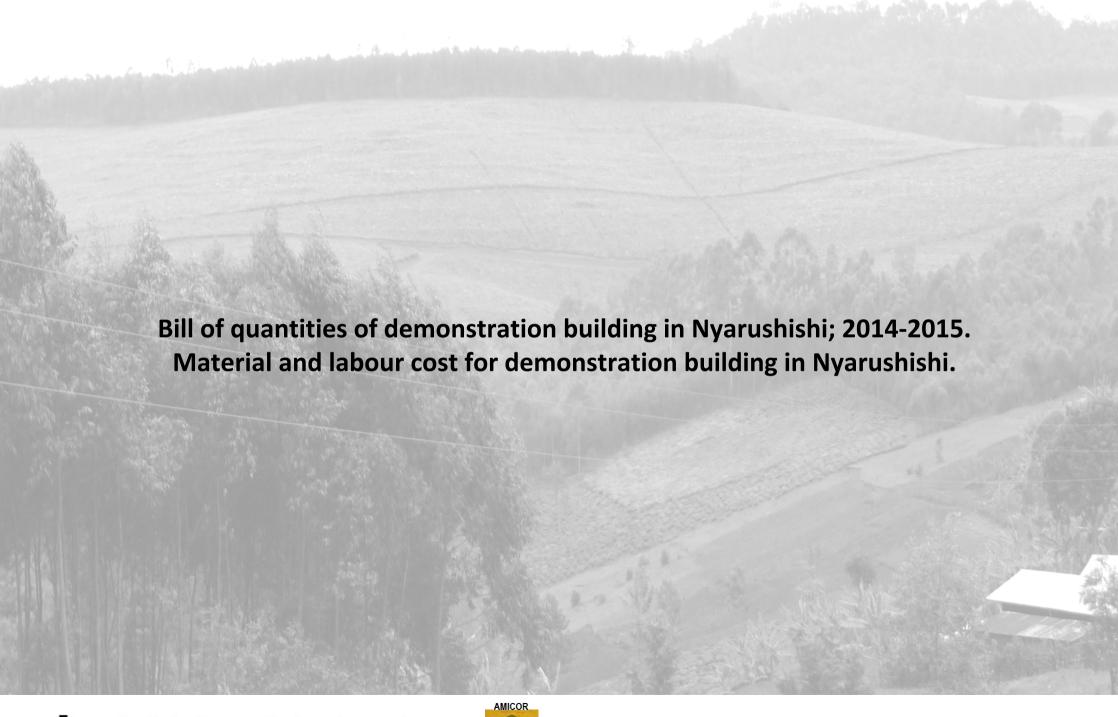
Cost of material and labour in Nyarushishi in 2014 2015.

Designation	Unit	Unit cost including transport to the site
Specie		
Unskilled labour	Ve0	1.500,00 RWF
Masson	Aed	3.000,00 RWF
Carpenters	Day	4.500,00 RWF
Foreman	Day	5.600,000 RWF
Minerals		
Stone Mwezi	m3	13.750,00 RWF
Gravel	m3	21.250,00 RWF
SCEB soif Kyazo	m3	23.750,00 RWF
Doorbole months of all		
Ventilation	195	800.00 RWF
Clay roofing tiles	Unit	130,00 RWF
Fred bribls	Unest	40,00 RWF
Stabilized adobe 20x20x10	Unit	75,00 RWF
SCEB 100x140x295 Adobe 20x20x10	Unit	355,00 RWF 50,00 RWF
Binder	-100	TANG OF ONE C
Common	# OF 00	10 000 00 101
Water	щЗ	2.500,00 RWF
7-4-69		
Metal strip	1.2 m	100.00 BWF
Nails	100	1.200,00 RWF
Steel bar 6 mm.	12 m	2.500,00 RWF
Steel bar 12 mm	12 m	5.490,00 RWF
	*	The same plant of the same pla
Wood		
Planck 170*50*360	15	2.600,00 RWF
Planck 50*50*360	155	900,00 RWF
Local mat for ceiling (1,2*2 m)	Tient	1.400,00 RWF
Local poles (wood)	4m	1.400,00 RWF
Carpentry		
Dutside door (0,9 * 2,1 m) Induding all hardware Inside door (0,9 * 2,1 m) Induding all hardware		51,000,00 RWF 41,000,00 RWF
Windows (1,17*0,95 m)	ton	41.000,00 RWF
Windows (1,20*0,90 m)	Unit	41.000,00 RWF
Others		
Dead off	201	6.000,00 RWF
Oil paint	4 litre	9.500,00 RWF
Plastic tarpoling	ani oz	6.500.00 RWF
PVC pipe for tollet	Lump sum	10.000,00 RWF
Gutter (metal) 1,5 mm	2mil	8.000,00 RWF
Hardware for gutter	Lump sum per linear meter	1.000,00 RWF
Water tank 2 000 liter Glass	Unit 1*1,2 m	290.000,00 RWF 10.000,00 RWF
Electricity		
Wire 1,5mm	rolls 100m 1x2.5mm	9.500,00 RWF
PVC pipe 5/8	e m	400,00 RWF
Socients	in the second	550,00 RWF
Lamp	Unit	750,00 RWF





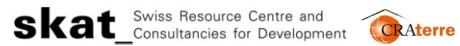






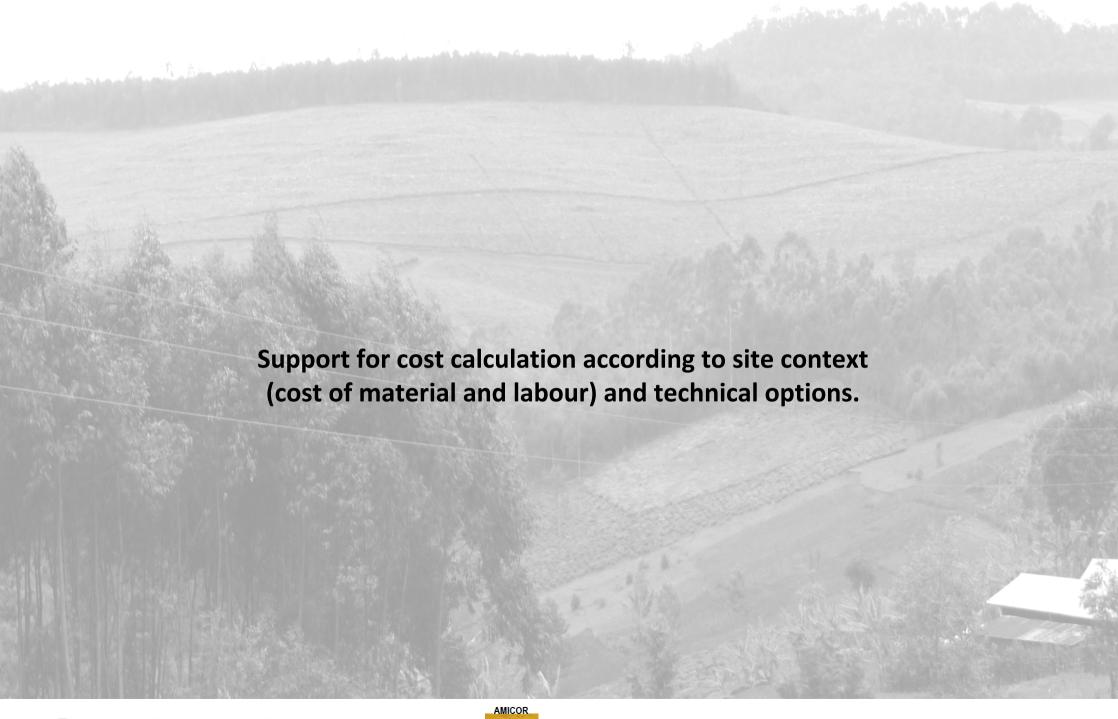
Items	Unit	Unit cost RWF	Unit cost US\$	Quantities	Cost RWF	Cost US\$
Site preparation	m²	30,00	0,04	167,58	5.027,40	7,34
Site Excavation	m3	1.050,00	1,53	498,60	523.530,00	764,28
Foundation excavation	ml	315,00	0,46	33,00	10.395,00	15,18
Stone foundation	ml	8.897,00	12,99	33,00	293.601,00	428,61
Stone massonry for bassement	ml	5.356,05	7,82	33,00	176.749,65	258,03
Poles and mud wall	m²	3.460,00	5,05	113,10	391.326,00	571,28
Roof (woodwork, waterproofing and clay tiles, includind hardware)	Living space (m2)	10.771,50	15,72	48,18	518.970,87	757,62
Windows	Unit	36.609,43	53,44	4,00	146.437,72	213,78
Internal doors	Unit	51.742,60	75,54	4,00	206.970,40	302,15
External doors	Unit	76.242,60	111,30	2,00	152.485,20	222,61
Concrete slab	m ²	6.221,67	9,08	40,80	253.844,00	370,58
Internal plaster	m²	1.360,90	1,99	176,44	240.117,20	350,54
Wooden external protection	m²	3.208,00	4,68	83,28	267.162,24	390,02
Ceiling with local mats	m²	2.537,25	3,70	40,80	103.519,80	151,12
Plinth	ml	336,15	0,49	57,20	19.227,78	28,07
Well	m3	3.930,00	5,74	7,85	30.866,22	45,06
Sink	m3	18.130,00	26,47	7,85	142.393,02	207,87
Lumpsum for electricity	Lumpsum	143.650,00	209,71	1,00	143.650,00	209,71
Watter tank and all hardware	Lumpsum	294.500,00	429,93	1,00	294.500,00	429,93
Gutters	ml	6.870,00	10,03	15,20	104.424,00	152,44
Pavement	ml	3.398,33	4,96	27,80	94.473,67	137,92
		TOTAL cost (labour and material) Living space			4.119.671,16 RWF	6.014,12 USD
					40,80	40,80
		Cost pe	r m2 of living space		100.972,33 RWF	147,40 USD

Nota 1: Cost is subject to change according to site specificity and inflation. Nota 2: Cost do not include taxes, margin of contractors, etc...











Désignation		2131123	Coût unitaire	Consequence	-2020	120200000
	Unité	Coût unitaire Frw	US\$	Quantities	Coût Frw	Coût US\$
Site preparation	m²			167,58		
Excavation	m3			according to site context (slope)		
Foundation excavation	ml		-	43,50		-
Options: Choose one of the following alternative						
Fired bricks foundation with cement/lime mortar	ml		-	43,50	-	
Stone foundation with cement/lime mortar	ml		-	43,50	-	-
Stone foundation with earth mortar and cement/lime pointing	ml			43,50	-	-
Options: Choose one of the following alternative	The state of the s					
Fired bricks foundation with cement/lime mortar	ml		-	43,50		-
Stone foundation with cement/lime mortar	ml		-	43,50	-	2
Fired brick foundation with earth mortar and cement/lime pointing	ml		-	43,50	-	
Stone foundation with earth mortar and cement/lime pointing	ml		-	43,50	-	-
Adobe walls	m2			113,10		
Options: Choose one of the following alternative	m ²		-	102	-	-
Corner reinforcment with Fired brick	m ²		-	1,30		-
Corner reinforcement with stabilised adobe	m ²		-	1,30	-	-
Horizontal Fired Brick massonry layer	ml		-	43,50	-	-
Options: Choose one of the following alternative						
Fired clay tile roof	m2 living space		-	48,18	-	-
Options: Choose one of the following alternative						
Lintel with wooden planck 5*7	ml		-	11,00	-	-
Lintel with wooden planck 2,5*7 plus fired brick arche	ml		-	11,00	-	-
Lintel with wooden planck 2,5*7 plus adobe arche	ml		-	11,00		-
RCC precast lintel	ml		-	11,00		-
Options: Choose one of the following alternative						
Windows	unité		-	4,00		-
Windows plus wall reinforcement with fired clay bricks	unité		-	4,00		-
Internal door	unité		-	4,00		-
Options: Choose one of the following alternative						
External door	unité		-	2,00		-
External door plus wall reinforcement with fired clay bricks	unité		-	2,00	-	-
Options: Choose one of the following alternative						
Wooden ring beam with planck 5*7	ml		-	43,50	-	
RCC ring beam	ml			43,50	-	
Concrete slab	m²			40,80		
Internal plaster	m²			176,44	-	
External plaster	m ²			83,28		







		TOTAL cost (labour and material) Living space Cost per m2 of living space		40,80	40,80
Other					
Other Other		=	ia		
Other					
Pavement	ml	Ψ,	27,80	-	
Gutters	ml	-	15,20	-	
Water storage	Forfait	-	1,00	-	-
Electricity	Forfait	-	1,00		-
Sink	m3	-	7,85	7	-
Well	m3	-	7,85		
Plinth	ml	-	57,20		
Ceiling out of local mats	m ²		40,80	-	-
Ceiling out of playwood	m ²	-	40,80		-
Options: Choose one of the following alternative					



